CLAIMS

What is claimed is:

1. An apparatus for decoding data comprising:

an array of storage elements having N rows and M columns, wherein an input of each element in each column may receive data from R elements of a previous column and an output of each element in each column may be received by R elements in a next column, and

wherein said inputs and outputs are logically interconnected according to an encoder polynomial for an error correction code.

2. The apparatus as in claim 1 wherein said encoder polynomial is a Viterbi encoder polynomial.

3. The apparatus as in claim 1 wherein R=2 for an encoder polynomial rate of 1/2.

4. The apparatus as in claim 1 wherein R=3 for an encoder polynomial rate of 1/3.

5. The apparatus as in claim 2 wherein M is equivalent to the depth of a Viterbi trellis.

6. The apparatus as in claim 5 wherein M = 64.

7. The apparatus as in claim 1 further comprising:

selection signals for selecting data for each element in each column from said R elements of a previous column, said selection signals generated based on a minimum path metric associated with each storage element.

8. The apparatus as in claim 7 wherein N selection signals select data for elements in each of said N rows in said matrix, thereby specifying for all M elements in each row which of said R elements from a previous column to select data, said selections causing data to propagate through said matrix according to said encoder polynomial.

9. The apparatus as in claim 8 wherein said selection signals are generated by add-compare-select units selecting the lowest of R potential path metrics.

10. The apparatus as in claim 9 wherein R = 2 for a code rate of 1/2.

11. The apparatus as in claim 1 further comprising minimization logic to identify a storage element in a final column of said matrix from which to select data.

12. The apparatus as in claim 11 wherein said minimization logic identifies said storage element based on said storage element having a minimum path metric associated therewith.

13. The apparatus as in claim 12 wherein said minimum path metric is determined based on a minimum of N accumulator values of add-compare-select units associated with each of said N rows.

14. A forward-tracing array for decoding data comprising:

a matrix of storage elements having N rows and M columns;

connection logic for interconnecting said storage elements across columns according to an encoder polynomial such that each element may receive data from R storage elements in a previous column; and

selection logic for selecting storage elements from said R storage elements from which to read data based on a calculated path metric associated with each of said R storage elements.

15. The apparatus as in claim 14 wherein said encoder polynomial is a Viterbi encoder polynomial.

16. The apparatus as in claim 14 wherein R=2 for an encoder polynomial rate of 1/2.

17. The apparatus as in claim 14 wherein R=3 for an encoder polynomial rate of 1/3.

18. The apparatus as in claim 15 wherein M is equivalent to the depth of a Viterbi trellis.

19. The apparatus as in claim 18 wherein M = 64.

20. The apparatus as in claim 14 wherein said selection logic further comprises:

N selection signals to select data for M elements in each of said N rows in said matrix, thereby specifying for all M elements in each row which of said R elements from a previous column to select data, said selections causing data to propagate through said matrix according to said encoder polynomial.

21. The apparatus as in claim 20 wherein storage elements in a first column of said matrix are loaded with constant values and said selection signals select data for M-1 elements in each of said N rows.

22. The apparatus as in claim 21 wherein said selection signals are generated by add-compare-select units selecting the lowest of R potential path metrics.

23. The apparatus as in claim 22 wherein R = 2 for a code rate of 1/2.

24. The apparatus as in claim 14 further comprising minimization logic to identify a storage element in a final column of said matrix from which to select data.

25. The apparatus as in claim 24 wherein said minimization logic identifies said storage element based on said storage element having a minimum path metric associated therewith.

26. The apparatus as in claim 25 wherein said minimum path metric is determined based on a minimum of N accumulator values of add-compare-select units associated with each of said N rows.

27. A machine-readable medium having code stored thereon which defines an integrated circuit (IC), said IC comprising:

an array of storage elements having N rows and M columns, wherein an input of each element in each column may receive data from R elements of a previous column and an output of each element in each column may be received by R elements in a next column, and

wherein said inputs and outputs are logically interconnected according to an encoder polynomial for an error correction code.

28. The machine-readable medium as in claim 27 wherein said encoder polynomial is a Viterbi encoder polynomial.

29. The machine-readable medium as in claim 27 wherein R=2 for an encoder polynomial rate of 1/2.

30. The machine-readable medium as in claim 27 wherein R=3 for an encoder polynomial rate of 1/3.

31. The machine-readable medium as in claim 28 wherein M is equivalent to the depth of a Viterbi trellis.

32. The machine-readable medium as in claim 31 wherein M = 64.

33. The machine-readable medium as in claim 27 further comprising:

selection signals for selecting data for each element in each column from said R elements of a previous column, said selection signals generated based on a minimum path metric associated with each storage element.

34. The machine-readable medium as in claim 33 wherein N selection signals select data for elements in each of said N rows in said matrix, thereby specifying for all M elements in each row which of said R elements from a previous column to select data, said selections causing data to propagate through said matrix according to said encoder polynomial.

35. The machine-readable medium as in claim 34 wherein said selection signals are generated by add-compare-select units selecting the lowest of R potential path metrics.

36. The machine-readable medium as in claim 35 wherein R = 2 for a code rate of 1/2.

37. The machine-readable medium as in claim 27 further comprising minimization logic to identify a storage element in a final column of said matrix from which to select data.

38. The machine-readable medium as in claim 37 wherein said minimization logic identifies said storage element based on said storage element having a minimum path metric associated therewith.

39. The machine-readable medium as in claim 12 wherein said minimum path metric is determined based on a minimum of N accumulator values of add-compare-select units associated with each of said N rows.

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